

REMARKS

Claims 68-116 are pending in the subject application. Due to a previous election, including election of species, claims 68, 69, 72, 73, and 75-80 are currently being considered. In the Office Action, claims 68, 69, 72, 73 and 76-80 are rejected and claim 75 is objected to but the Examiner indicates that the claim would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Information Disclosure Statement

The Examiner indicated that reference AAR by U. Shubert *et al.* was not considered because copies were not found within the application papers. Applicants herein submit a copy of the missing document.

Priority

Applicants completed the requirements of claiming priority to gain the benefit of the earlier applications by herein amending the subject application with a specific reference to the prior applications in the first sentence of the specification according to 37 C.F.R. 1.78.

Claim Objections

Claims 73 and 78 were objected to because the Examiner failed to see the difference between the two claims. Claim 78 has been amended to clarify the intended scope. Claim 78 comprises a macroinitiator produced from a non-ATRP polymerization of the macroinitiator of claim 68. This is patentably distinct from the macroinitiator of claim 73 which comprises at least one site that can initiate an ATRP and at least one initiation site that can initiate a non-ATRP polymerization.

Claim Rejections - 35 U.S.C. § 112, first paragraph

Claims 76 and 77 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or which it is most nearly connected, to make and/or use the invention. The Examiner states that claims 76 and 77 are drawn to a macroinitiator comprising the decomposition product of a macroinitiator in the presence of stable free radicals and that the decomposition product or the process of decomposing a macroinitiator in the presence of an excess of free radicals could not be found in the specification.

The support for these claims is found in the specification as filed in various locations. For example, the disclosure on page 15, line 31 to page 16, line 20 describes the decomposition of an initiator by the removal of the halogen atom at a chain end by using either M_t^n in at least a stoichiometric amount, or, more conveniently, by using a catalytic amount of M_t^n /ligand and a least a stoichiometric amount of M_t^0 . The specification specifically states on page 16, line 12 that "[t]he halogens can be replaced by reaction of the radical chain end (or small molecule, oligomer) with stable free radical deactivators." Additionally, the process is described on page 39, lines 7 to 12 and on page 42, lines 18 to 29.

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Example 51 exemplifies the process of decomposing an initiator in the presence of a stable free radical. One skilled in the art to which the invention pertains, or which it is most nearly connected, would be enabled by this disclosure to prepare a macroinitiator for a stable free radical mediated polymerization process, by the disclosure described above. The examples which pertain to the small molecule

initiators would readily be understood by one skilled in the art to also apply to the macroinitiators of claim 73. Claim 77 is drawn to a specific example of the macroinitiator of claim 76.

Claim Rejections - 35 U.S.C. § 102

Claims 68, 69, and 72 are rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 4,007,165 issued to MacLeay et al. ("MacLeay"). The Examiner explains the MacLeay discloses a series of chlorinated azo initiators for olefin polymerization, specifically citing columns 43 and 44, Table I, Examples XXIX-XXXIV, lines 3-21 and column 56, Example LXXVII, lines 36-38. The azo moiety can initiate a non-ATRP, free radical polymerization, and the chloride moiety can initiate an ATRP polymerization much like the elected species of the Applicants.

Applicants respectfully disagree. MacLeay does not provide an initiator for standard free radical polymerization and ATRP as does the Applicant's elected species, 2,2' Azobis [2-methyl-N-(2-(2-bromoisobutyryloxy)-ethyl) propionamide]. The chlorine groups in U.S. Patent 4,007,165 are described as α -chloro-alkanes at column 42, line 15 and in the examples in Table 1. α -Chloro-alkanes are not suitable species for ATRP since, at the present time, the catalysts employed for ATRP cannot transfer such an unactivated halide away from the molecule; i.e. the chloride atoms of the compounds of MacLeay are not radically transferable atoms. This is the reason that the ATRP process cannot polymerize ethylene or propylene. However, if the α -position is activated then it is possible to run an ATRP process. None of the initiators disclosed in MacLeay are known to or would be expected to initiate an atom or group transfer radical polymerization. Initiators for ATRP are discussed in detail on page 29, line26 to page

33, line 13. The importance of the radically transferable atom or group is described on page 29, lines 28-30.

Applicants respectfully submit that since the disclosure of MacLeay does not anticipate independent claim 68, dependent claims 69 and 72 are also not anticipated by this disclosure. Applicants also respectfully submit that there is no motivation provided in MacLeay or from the knowledge of one skilled in the art to modify the disclosed compounds to provide a radically transferable halogen atom in order to provide the claimed macroinitiators, especially considering that ATRP was not a known polymerization process at the time of filing of MacLeay, March 21, 1974.

Claim Rejections - 35 U.S.C. § 103

Claims 73 and 78-80 were rejected under 35 U.S.C. § 103(a) as being unpatentable over MacLeay. The Examiner states that MacLeay is relied upon for the same reasons as applied to claims 68, 69, and 72. As described above the compounds cited in MacLeay cannot be used to initiate an ATRP process. Since the compounds of MacLeay may not be used for an ATRP process, it would not have been obvious to one skilled in the art of initiators to prepare the chlorinated azo initiators of MacLeay and carry out the polymerizations of ethylene, vinylchloride or styrene to prepare a macroinitiator.

Certain basic considerations apply to obviousness rejections. The Manual of Patent Examining Procedures ("MPEP") describes the following tenets of patent law which must be adhered to:

- (A) The claimed invention must be considered as a whole;

(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention and

(D) Reasonable expectation of success is the standard with which obviousness is determined. *MPEP §2141*, citing *Hodosh v. Block Drug., Inc.*, 786 F.2d 1136, 1143 n.5, 229 U.S.P.Q 182, 187 n.5 (Fed. Cir. 1986).

MacLeay does not provide any suggestion of the desirability of producing a macroinitiator for the preparation of block copolymers comprising at least one initiation site that can initiate an atom or group transfer radical polymerization and at least one initiation site that can initiate a non-ATRP polymerization. Specifically, the desirability of a multifunctional polymerization initiator is not suggested, especially, not the desirability of a multifunctional polymerization initiator comprising an ATRP initiation site. The compound would have to be modified to convert the halogen atom into a radically transferable atom, and then convert the initiator into a macroinitiator. No such motivation is found in MacLeay. Even through impermissible hindsight vision afforded by the claimed invention, claims 73 and 78-80 do not become obvious to one skilled in the art. Impermissible hindsight vision may provide motivation to modify the compounds to provide the radically transferable atom or group, however, there would be no motivation to provide a macroinitiator. Therefore, Applicants respectfully submit that claims 73 and 78-80 are not obvious based upon MacLeay or any reference of record in the subject application.

Allowable Subject Matter

The Examiner has indicated that claim 75 is objected to as being dependent upon a rejected base claim but claim 75 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants respectfully submit that, based upon the arguments submitted above that the base claim 68 and the intervening claims 69 and 72 are patentable, therefore claim 75 has not be rewritten in independent form but should be considered patentable in dependent form.



CONCLUSION

Applicants fully address each basis for rejection under § 112, §102 and §103.

Reconsideration of the objections and rejections of the claims of the subject application is respectfully requested. Applicants submit that the claims as amended herein are in condition for allowance. Applicant requests such action at an early date. Should the Examiner have any remaining concerns, he is requested to contact the undersigned at the telephone number below so that those concerns may be addressed without the necessity for issuing an additional Office Action.

Respectfully submitted,

A handwritten signature of "Bernard G. Pike" is written over a large, stylized oval. Below the oval, the text "Registration No. 46,993" is printed.

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Claims of the Subject Application indicating Amendments

77. (Amended) The macroinitiator of Claim 76, which is formed by a low temperature controlled atom or group transfer polymerization of dimethylaminomethyl (meth)acrylate with an initiator comprising a dihalosubstituted group as an initiator for ATRP and a second functional group that will thermally decompose to form free radicals, forming a polydimethylaminomethyl methacrylate macroinitiator containing said second functional group substantially in the center of the polymer chain, for direct initiation of further free radically polymerizable monomers or conversion into an macroinitiator for a stable free radical mediated polymerization process by raising the temperature of the polymer to form a free radical in the presence of an excess of a stable free radical which reacts with the initially formed macro-free radical forming a thermally labile group suitable for further free radical mediated controlled free radical polymerization.

78. (Amended) A macroinitiator for the preparation of block copolymers, comprising the reaction product of initiating a non-ATRP polymerization of a (co)monomer with the initiator of Claim 6968, wherein the reaction product comprises one or more radically transferable atom(s) or group(s).